Azure Stack
Your Cloud Your Datacenter

Thomas Maurer
Technology Lead at itnetX
Microsoft MVP

@ThomasMaurer
www.thomasmaurer.ch
Thomas Maurer

- Technology Lead @ itnetX
  - MCSE Private Cloud
  - MCSE Server Infrastructure
  - MCSD Azure Solution Architect
  - Microsoft MVP Cloud & Datacenter

- Twitter & Blog
  - www.thomasmaurer.ch
  - @thomasmaurer
Azure Stack – The Extension of Microsoft Azure
Power of Azure in your datacenter

Microsoft Azure Stack is a new hybrid cloud platform product that enables organizations to deliver Azure services from their own datacenter to help them achieve more.
Private, public, and hybrid cloud

Platform engineered with commonalities for flexibility and consistency

- Development code once, deploy VMs anywhere
- Management unified view across premises
- Identity single sign-on
- Virtualization built in, not an add-on
- Data analytics and storage spanning clouds
Hybrid use cases: Azure and Azure Stack

- Edge and disconnected solutions
- Cloud applications to meet varied regulations
- Cloud application model on-premises
Power of Azure and the Control of the Datacenter
Microsoft Azure Stack

Microsoft Azure Stack (on premises | hosted)
Azure Resource Manager
Azure Resource Manager

Describe
Deploy
Control

Azure Resource Manager

MICROSOFT AZURE STACK

MICROSOFT AZURE
Delivering Azure Stack as an integrated system

- Software
- Hardware
- Support
- Services
Azure Stack integrated systems

Accelerated time to value
- From concept to operations in days, not months
- Help developers be productive much faster

Enriched lifecycle management
- Greater quality and system reliability
- Focus on delivering Azure services, not operations

Continuous innovation
- Newest services and fastest updates
- No disruption to tenant availability or experience
Azure Stack integrated systems

- Do-it-yourself
- Reference architecture
- Integrated systems

Faster time to value

More customization
Speed & standardization
Key Design Decisions

- Infrastructure manager vs System Center
- Hyper-converged vs Converged
- Sealed host
- Scaling
- Integrated Systems
Azure Stack Integrated System (Life Cycle)

- Architecture, hardware, and topology
- Deployment, configuration, provisioning
- Validation
- Monitoring, diagnostics
- Security and privacy
- Business continuity
- Patching and updating
- Field replacement of parts
Internals are Internal
Azure Stack Integrated Systems

Partners
Integrated delivery experience

- Integrated systems
- Fast to deploy
- Pay-as-you-use
- Integrated support, broadly available

Huawei integrated systems will be available in Q1 CY18.
Azure Stack concepts

**Cloud**
- Single instance of Azure Resource Manager (ARM)
- 1 or more Regions under management of ARM
- 1 or more Scale Units within a Region
- 4 or more servers within a Scale Unit

**Region**
- Set of Scale Units that share same “physical location”
- Under one physical and logical “administrator”
- Networking requirements
  - High-bandwidth/low latency
  - Flat, layer-3 network
- Other attributes are implied by customer choices

**Scale Unit**
- Associated with a single Region
- 1 or more Scale Units within a Region
- Unit of capacity expansion
- Fault domains (Azure consistency)
- Alignment of Hardware SKU – which is homogenous within Scale Unit
Azure Stack: Scale architecture

1. One cloud “endpoint”
2. Several regions
3. Multiple scale units (SU) per region

Example: Global enterprise or service provider

GA
(#servers per scaleunit, #scaleunits, #regions)
(12, 1, 1)

CY 2018
Incremental capacity expansion
Multi-region and then multi scale units
Peek into a Scale Unit

- 4 x servers + network switches
- Min spec for server
  - 2 x 10 Gb ports with RDMA
  - 256 GB Memory
  - 1 x boot media, 2 x SSD (cache) + 4 x HDD
  - 8 x cores per CPU, min 2 x CPU’s
- Each server runs Windows Server 2016
- Failover cluster with hyper-converged storage spaces direct
- Resilient deployment of Azure Stack software in VM’s
- Appropriate resiliency for each layer
Azure Stack Datacenter Operations & Integration
Cloud operating model and job roles

**Azure customers**
- Use Azure

**Microsoft engineers**
- Operate Azure

**Your customers**
- Use Azure Stack instance

**Your engineers**
- Operate Azure Stack instance

- DevOps
- Cloud Administrator
- Cloud Architect
- Cloud Operator
Azure Stack Cloud Operator vs System Administrator

Microsoft Azure Stack - Administration

Dashboard

Get started
- Learn how to provision VMs in minutes

Offering tenant services
- Learn how to offer services to your tenants

Azure Stack Marketplace
- Learn how to add external content to Azure Stack

Monitoring Azure Stack infrastructure
- Learn how to view health status and alert in Azure Stack

Azure Stack portal
- Learn how to use the Azure Stack portal

Resource Providers

<table>
<thead>
<tr>
<th>NAME</th>
<th>STATUS</th>
<th>ALERTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Updates</td>
<td>Unknown</td>
<td>0</td>
</tr>
<tr>
<td>Network</td>
<td>Unknown</td>
<td>0</td>
</tr>
<tr>
<td>Storage</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Compute</td>
<td>Unknown</td>
<td>0</td>
</tr>
<tr>
<td>Key Vault</td>
<td>Unknown</td>
<td>0</td>
</tr>
<tr>
<td>Capacity</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Virtual Machines

- Name: MAS-AC501
  - State: Running
  - CPU Usage: 0%
  - Assigned Memo: 0

Checkpoints

The selected virtual machine has no checkpoints.

Created: 5/29/2017 3:47:37 PM
Configuration Version: 8.0
Generation: 2
Notes: None
Azure Stack: Integration in your datacenter

Border Devices

Datacenter monitoring/ticketing/hardware monitoring

Identity Integration (User & Cloud Operator)

Space, Power & Cooling

TOR switch

BMC Switch

Server

Server

Server

Server

Hardware Lifecycle Host

Scale Unit
Patching and Update

- Pre-validated updates for software and firmware
- Designed to not disrupt tenant workloads
- Designed to be reliable, single-sourced and easy to use
- Designed to allow focus on other aspects of the business
Azure Stack: Backup and Disaster Recovery

Cloud backup service

On-premises Backup Target

External File Share

IaaS

PaaS

LRS blob replica, blob snap

Tenant space

Azure Infrastructure

Admin space

Azure Site Recovery

Cloud backup service

Tenant space

Admin space

IaaS

PaaS

Azure Infrastructure
Azure Stack Developer Kit
What is the development kit?
The idea behind the One-node Development Kit is:

- Limited deployment duration (hours)
- Minimal hardware required
- Reduced component install (non-HA)
- Easy to install (PowerShell)
- Enable on-premises Azure modern application development
- Can integrate into a larger environment
## Development Kit Hardware Requirements

<table>
<thead>
<tr>
<th>Component</th>
<th>Minimum</th>
<th>Recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disk drives: Operating System</td>
<td>1 OS disk with minimum of 200 GB available for system partition (SSD or HDD)</td>
<td>1 OS disk with minimum of 200 GB available for system partition (SSD or HDD)</td>
</tr>
<tr>
<td>Disk drives: General development kit data*</td>
<td>4 disks. Each disk provides a minimum of 140 GB of capacity (SSD or HDD). All available disks will be used.</td>
<td>4 disks. Each disk provides a minimum of 250 GB of capacity (SSD or HDD). All available disks will be used.</td>
</tr>
<tr>
<td>Compute: CPU</td>
<td>Dual-socket: 12 Physical Cores (total)</td>
<td>Dual-socket: 16 Physical Cores (total)</td>
</tr>
<tr>
<td>Compute: Memory</td>
<td>96 GB RAM</td>
<td>128 GB RAM (This is the minimum to support PaaS resource providers.)</td>
</tr>
<tr>
<td>Compute: BIOS</td>
<td>Hyper-V Enabled (with SLAT support)</td>
<td>Hyper-V Enabled (with SLAT support)</td>
</tr>
<tr>
<td>Network: NIC</td>
<td>Windows Server 2012 R2 Certification required for NIC; no specialized features required</td>
<td>Windows Server 2012 R2 Certification required for NIC; no specialized features required</td>
</tr>
<tr>
<td>HW logo certification</td>
<td>Certified for Windows Server 2012 R2</td>
<td>Certified for Windows Server 2012 R2</td>
</tr>
</tbody>
</table>

Source: https://docs.microsoft.com/de-de/azure/azure-stack/azure-stack-deploy
Azure Stack Services
Azure IaaS available on-premises: beyond traditional virtualization

**Roadmap**: Additional Azure consistency (New VM types, Managed Disks, storage API updates) in CY18.
## Azure PaaS available on-premises: High productivity development

<table>
<thead>
<tr>
<th>Azure App Service</th>
<th>Azure Functions</th>
<th>Azure Service Fabric</th>
<th>Azure Container Service (ACS)</th>
<th>Cloud Foundry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Web, Mobile, and API apps</td>
<td>Serverless Computing</td>
<td>Scalable distributed applications, deploy standalone Service Fabric clusters initially</td>
<td>Container management, with ACS engine support for Docker Swarm, Kubernetes, and Mesosphere DC/OS</td>
<td>Open source platform</td>
</tr>
</tbody>
</table>

**Roadmap:** Azure Service Fabric-as-a-Service and Azure Container Service-as-a-Service are planned to be available in CY18
One Azure ecosystem

Work with the tools and technologies you want across Azure and Azure Stack

<table>
<thead>
<tr>
<th>Pivotal Cloud Foundry</th>
<th>docker</th>
</tr>
</thead>
<tbody>
<tr>
<td>bitnami</td>
<td>redhat</td>
</tr>
<tr>
<td>Blockchain</td>
<td></td>
</tr>
<tr>
<td>Zerodown Software</td>
<td>Kemp Technologies</td>
</tr>
<tr>
<td>Trend Micro</td>
<td></td>
</tr>
<tr>
<td>Barracuda</td>
<td>Check Point</td>
</tr>
<tr>
<td>Canonical</td>
<td></td>
</tr>
<tr>
<td>Chef</td>
<td>Kubernetes</td>
</tr>
<tr>
<td>Cloud Foundry</td>
<td>Suse</td>
</tr>
</tbody>
</table>

Goal: Applications and services that are certified for Azure work on Azure Stack
Azure Stack Packaging and Pricing & Support
Hybrid by design

- Azure Stack is an extension of Azure
- Business Model is an extension to the Azure model
- Billings to you are based on actual customer usage
Purchased as an integrated system

Azure services
Billed by Microsoft via EA or CSP, support via Premier or Azure agreement.

Hardware
Purchased directly from hardware partners, including support and installation services.

Support
One integrated experience.
Pay-as-you-use model

Extension of Azure business model

Fee for consumption: only pay for services running on Azure Stack

No upfront licensing fees: don’t pay until you use the service

Compatible with Azure: same subscriptions, monetary commitment, invoice

EA and CSP channels
## Pay-as-you-use pricing

### Pay-as-you-use Pricing

<table>
<thead>
<tr>
<th>Service</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up-Front Licensing</td>
<td>$0 – no upfront licensing fees</td>
</tr>
<tr>
<td>Azure Stack initial deployment</td>
<td></td>
</tr>
<tr>
<td>Consumption-Based Fees</td>
<td></td>
</tr>
<tr>
<td>Cloud Infrastructure; Management, Security, &amp; Identity;</td>
<td></td>
</tr>
<tr>
<td>Networking; Service Fabric</td>
<td></td>
</tr>
<tr>
<td>Virtual Machines: Base VM</td>
<td>$0.008/vCPU/hour ($6/vCPU/month)</td>
</tr>
<tr>
<td>Virtual Machines: with Windows Server</td>
<td>$0.046/vCPU/hour ($34/vCPU/month)</td>
</tr>
<tr>
<td>Azure Blob Storage Service</td>
<td>$0.006/GB/month</td>
</tr>
<tr>
<td>Azure Tables &amp; Queues Storage Service</td>
<td>$0.018/GB/month</td>
</tr>
<tr>
<td>Azure Standard Unmanaged Disk</td>
<td>$0.011/GB/month</td>
</tr>
<tr>
<td>Azure App Service (including Functions)</td>
<td>$0.056/vCPU/hour ($42/vCPU/month)</td>
</tr>
</tbody>
</table>

- Customers can bring their own Windows Server and SQL Server licenses to run on Base VM images
- Windows Server BYOL – must license the entire region
Capacity model
For disconnected scenarios: no usage metering or connection to commerce

Fixed fee, annual subscription: based on number of physical cores

License all physical cores on a solution, with unlimited IaaS rights

Separate transaction from Azure: cannot use monetary commit, different billing

EA channel only
Capacity model pricing

**App Service Package**
- Includes: App Service, Base VM, Azure Storage
- Must license all physical cores on the deployment
- Windows Server and SQL Server are BYOL (on-premises license)
- $400/core/year

**IaaS Package**
- Base VM, Azure Storage only
- Must license all physical cores on the deployment
- Windows Server and SQL Server are BYOL (on-premises license)
- $144/core/year
With the capacity model, you use your existing on-premises licenses to deploy Windows Server and SQL Server virtual machines.

The capacity model is available via EA only. It is purchased as an Azure Plan SKU via normal volume licensing channels. For typical use cases, Microsoft expects the pay-as-you-use model to be the most economical option.

Support

Azure Stack support is a consistent, integrated, hybrid support experience.
Today Microsoft released the packaging and pricing information for Azure Stack in July 2017. You can download the Azure Stack packaging and pricing and the Azure Stack Customer Licensing Guide PDF here. If you want to know more about Azure Stack, check out my blog posts Microsoft Azure Stack - Azure Extension in your Datacenter.

The Azure Stack pricing models

Azure Stack will be offered in two different models, Pay-as-you-use model and Capacity model. The pay-as-you-use model is licensed by Microsoft via the Enterprise Agreement (EA) or Cloud Service Provider (CSP) programs. The capacity model is available via EA only. It is purchased as an Azure Plan S1UC via normal volume licensing channels. For typical use cases, Microsoft expects the pay-as-you-use model to be the "most economical" option.

Azure Stack Pay-as-you-use model

For the pay-as-you-use model, you will be able to take advantage of the cloud economics and only pay for resources which are actually consumed, plus additional costs for the Azure Stack hardware and the operations.

Service prices:

- Base virtual machine: $0.0010/hour ($6/hour/month)
- Additional CPU: $0.0015/hour ($9/hour/month)
- Additional RAM: $0.0002/hour ($1.2/hour/month)
- Additional NIC: $0.0001/hour ($0.6/hour/month)
- Additional storage: $0.0001/hour ($0.6/hour/month)
Integrated support experience

Azure-consistent support experience no matter who you need support from

Coordinated escalation and resolution process

Cloud services support delivered by Microsoft
Existing Azure support or Premier Support contract

System support delivered by hardware partners
System support contract with hardware partners
Two ways to purchase Azure Stack

As an integrated system

Customer controls management and operations (DIY or via SI)

Two contracts: one for Azure services and another for hardware

Typically hosted at customer premises

**Example:** Customer purchases Azure services from Microsoft, integrated systems from Dell EMC/HPE/Lenovo

---

As a fully managed service

Managed service provider does management and operations

Single point of purchase, one contract

Typically hosted at managed service provider premises

**Example:** Customer purchases a complete solution from itnetX or one of other Azure MSPs

---

One integrated support experience
Microsoft Azure Stack Deployment Worksheet

As a preparation for your Azure Stack deployment, it's important that you plan, prepare and fill out both tabs in this deployment workbook, prior to starting the deployment of your Azure Stack solution.

Please note: if your role does not involve managing the network infrastructure in your IT environment, it is critical to communicate with the appropriate network, identity and security teams to complete the information required to deploy Azure Stack.

Azure Connection, Identity Store, and Billing Model Decisions

Determine if Azure Stack will connect to Microsoft Azure. If connecting to Microsoft Azure, please identify the Identity Store and Billing Mode.

Read this article to learn more.

Connected?

Connect to Azure

Selected

Connect your Azure Stack system to Microsoft Azure (the deployment virtual machine must have Internet access), choose between Azure Active Directory and Active Directory Federation Services to manage your identities, register your Azure Stack system to establish syndication between Azure Gallery and your Azure Stack Gallery, and choose a billing model.

Read the Companion guide section to learn more about billing models.

Choose identity store: Azure Active Directory

Choose billing model: Consumption-based billing

Azure Active Directory Information (applicable when you select to deploy Azure Stack in a Connected mode)

The following parameters are required to deploy Azure Stack by using Azure Active Directory (AAD) as your identity store. Infrastructure services and their principal objects

Customer and Environment Info Network Settings HPE Customer Pre-Delivery Checklist
Summary: Accurately positioning Azure Stack

<table>
<thead>
<tr>
<th>What it is</th>
<th>What it isn’t</th>
</tr>
</thead>
<tbody>
<tr>
<td>First consistent Hybrid Cloud Platform</td>
<td>Virtualization-replacement play</td>
</tr>
<tr>
<td>Integrated system with IaaS &amp; PaaS</td>
<td>DIY infrastructure</td>
</tr>
<tr>
<td>Regularly updated for Azure-consistency</td>
<td>Static system you deploy &amp; forget</td>
</tr>
<tr>
<td>Truly open and flexible (just like Azure)</td>
<td>.NET/Windows only</td>
</tr>
</tbody>
</table>
Take the Survey!

Your feedback is important! Please rate the session for a chance to win!

Survey is below session description at http://elus18.expertslive.us
# Related Sessions – Hybrid Cloud

<table>
<thead>
<tr>
<th>Time</th>
<th>Speaker</th>
<th>Room</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>2/8: 10:30</td>
<td>Joyner</td>
<td>College Park</td>
<td>Azure Site Recovery: Tips from the Trenches</td>
</tr>
<tr>
<td>2/8: 11:45</td>
<td>Maurer</td>
<td>Sterling Ridge</td>
<td>10 hidden Hyper-V features you should know about!</td>
</tr>
<tr>
<td>2/8: 3:30</td>
<td>Maurer</td>
<td>Creekside Park</td>
<td>Azure Stack - Everything you need to know!</td>
</tr>
<tr>
<td>2/9: 8:00</td>
<td>Track</td>
<td>Waterway 6</td>
<td>AMA Panel Discussion: Hybrid Cloud</td>
</tr>
<tr>
<td></td>
<td>Speakers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2/9: 9:00</td>
<td>Scholman</td>
<td>Sterling Ridge</td>
<td>Top 5 learnings from implementing Azure Stack in the real world</td>
</tr>
<tr>
<td>2/9: 2:00</td>
<td>Maurer</td>
<td>Sterling Ridge</td>
<td>Windows Server: What is next for Windows Server</td>
</tr>
<tr>
<td>2/9: 3:30</td>
<td>Joyner</td>
<td>Sterling Ridge</td>
<td>Business Continuity &amp; the Microsoft Cloud</td>
</tr>
</tbody>
</table>
Thanks!
Azure Stack
Your Cloud Your Datacenter

Thomas Maurer
Technology Lead at itnetX
Microsoft MVP

@ThomasMaurer
www.thomasmaurer.ch